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Tunics Reference SPECIFICATIONS

Tunable Laser from 1390nm to 1650nm



Highest Accuracy in the Industry
Tunics Reference is the new benchmark in tunable laser sources for test applications offering the best specifications for all types of DWDM measurements. This "gold standard" tunable laser features a ±25 pm wavelength accuracy with an automated built-in recalibration process, avoiding the need for an external wavelength meter. When higher wavelength accuracy is needed, a built-in Michelson-based wavelength meter could be added to reach an impressive ±5 pm absolute wavelength accuracy (IWM option).

High Output Power
Fast, reliable measurements of high performance telecommunication components and systems often present challenging power budget constraints, which only a high-power, yet low-noise source can resolve. While featuring the broadest tuning range in the industry, the Tunics Reference delivers optical power in excess of +10 dBm. This is a must when characterizing optical amplifiers and DWDM systems.

Largest Tuning Range in the Industry
In one single instrument, the Tunics Reference guarantees a tuning range of up to 160 nm at 0 dBm, covering multiple bands from 1390 nm to 1650 nm.

Sweeping and Step-by-Step Modes
The Tunics Reference features two operating modes. The sweeping mode delivers a continuous variation of the wavelength at a constant rate to enable a fast and uninterrupted measurement. In the step-by-step mode, the laser stops at the required wavelength to allow for long-term testing as well as in-process alignments.

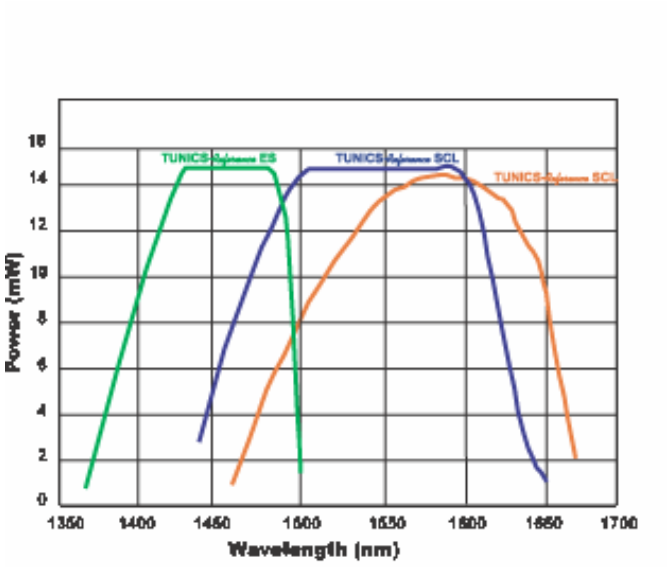


Fig.1: Power vs wavelength typical performance.

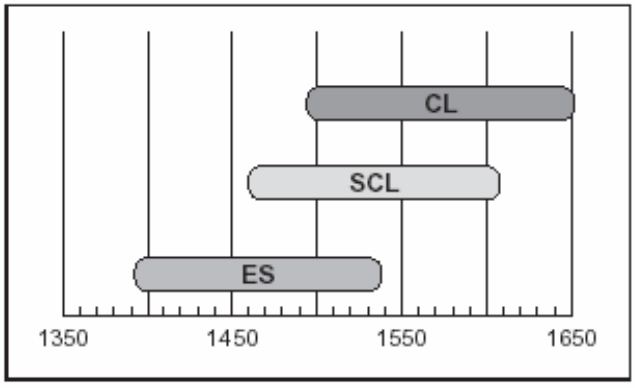


Fig.2: Power vs wavelength typical performance.

Entirely Mode-Hop Free
With continuous output power whether stepping or sweeping, Tunics Reference guarantees smooth spectral sweeps free of any mode hops over the entire (min. 150 nm) tuning range thanks to real-time optimization of the laser cavity alignment through the use of feedback loops.

High Stability
Offering ±1 pm/h wavelength stability (with IWM option, ±5 pm/h otherwise)
Tunics Reference allows long-term testing such as thin-film growth monitoring.

Additional Features
- Tunics Reference provides both optical and electrical monitoring outputs. It is able to interface with wavelength meters (through RS-232 C) to achieve their accuracy or with oscilloscopes for quick and easy spectral insertion loss characterization.
- Tunics Reference provides IEEE 488.2 interface along with SCPI commands.

Tunics Reference				
Specifications				
		Tunics Reference ES	**Tunics Reference SCL**	**Tunics Reference CL**
Tuning Characteristics	**Wavelength range (mode hop free)**			
	· P = 0 dBm	1390-1540 nm	1460-1610 nm	1490-1650 nm
	· P = 3 dBm	1410-1530 nm	1470-1590 nm	1510-1640 nm
	· P = 6 dBm	1420-1520 nm	1480-1580 nm	1520-1630 nm
	· P = 8 dBm	1440-1510 nm	1500-1580 nm	1540-1630 nm
	· P = 10 dBm	1450-1510 nm	1520-1570 nm	1565-1615 nm
	Absolute wavelength accuracy[1,7]	±25 pm	±25 pm	±25 pm
	Wavelength Stability[3]	±5 pm / h (±3 pm / h typical and ±5 pm / 24h typical)		
	Tuning repeatability (typ.)	±5 pm	±5 pm	±5 pm
	Wavelength setting resolution	1 pm	1 pm	1 pm
	Optical frequency fine tuning	±2 GHz	±2 GHz	±2 GHz
	Tuning speed (typ.)	1 s (100 nm)	1 s (100 nm)	1 s (100 nm)
Integrated Wavelength Meter Option (IWM)	**Absolute wavelength accuracy**[1, 8]	±5 pm	±5 pm	±5 pm
	Wavelength Stability[3]	±1 pm / h (±1 pm / 24h typical)		
	Tuning repeatability(typ.)	±1 pm	±1 pm	±1 pm

Notes
Unless otherwise specified, specifications are given after 30 minute warm-up.

1 After self calibration, temperature remaining within ±3°C from self-calibration temperature

2 Over 100 scans at constant temperature

3 Over one hour at a constant temperature and after 2 hour warm-up

4 Measured with 0 dBm output power

5 Spontaneous emission measured within a 0.1 nm bandwidth at ±1 nm from the signal

6 Measured at an electrical frequency of 100 MHz

7 Accuracy given at 3 sigma after automated self recalibration: the wavelength errors on the whole spectral range follow a normal distribution, with 99.7% of the values are inferior to 25 pm.

8 With M option: for operating temperature between +18°c and +30°c.

9 Tested and validated with National Instruments GPIB board.

Tunics Reference				
Specifications				
		Tunics Reference ES	**Tunics Reference SCL**	**Tunics Reference CL**
Sweeping-Mode Characteristics	**Mode hop free range**	Whole wavelength range for each specified power	Whole wavelength range for each specified power	Whole wavelength range for each specified power
	Scan speed	Adjustable from 1 to 100 nm/s	Adjustable from 1 to 100 nm/s	Adjustable from 1 to 100 nm/s
	Power flatness during scan (typ.)	±0.25 dB	±0.25 dB	±0.25 dB
	Power repeatability from scan to scan (typ.)[2]	±0.05 dB	±0.05 dB	±0.05 dB
	Laser Output Characteristics			
	Power stability[3]	±0.01 dB / h (±0.025 dB / 24h typical)		
	Side mode suppression ratio[4]	> 45 dB	> 45 dB	> 45 dB
	Signal to source spontaneousemission ratio[5]	> 55 dB	> 55 dB	> 55 dB
	Relative intensity noise[4,6]	-145 dB/Hz (typ.)	-145 dB/Hz (typ.)	-145 dB/Hz (typ.)
	Spectral Width (FWHM)	**150 kHz (typ.) (coherence control OFF)** **> 100 MHz (coherence control ON)**		
Interface	**Optical connector**	FC-APC	FC-APC	FC-APC
	Output fiber	SMF-28™	SMF-28™	SMF-28™
	Output isolation	35 dB	35 dB	35 dB
	Return loss	60 dB	60 dB	60 dB
	Remote control	RS-232 C and IEEE-488.2[9]	RS-232 C and IEEE-488.2[9]	RS-232 C and IEEE-488.2[9]
	Low frequency modulation	10 kHz to 8 MHz	10 kHz to 8 MHz	10 kHz to 8 MHz
	High frequency modulation	30 kHz to 1 GHz	30 kHz to 1 GHz	30 kHz to 1 GHz
General Specifications	**Operating temperature range**	+18 to +35°C (+65 to +90°F)	+18 to +35°C (+65 to +90°F)	+18 to +35°C (+65 to +90°F)
	Power supply	100 to 240 V (50 to 60 Hz)	100 to 240 V (50 to 60 Hz)	100 to 240 V (50 to 60 Hz)
	Dimensions (W x H x D) in mm[3]	448 x 133 x 370	448 x 133 x 370	448 x 133 x 370
	Weight	12.5 kg	12.5 kg	12.5 kg

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Options

Use the following code references that correspond to the available options:

Code	Description
M	Polarization maintaining output fiber (orientation TE in slow axis, in line with connector key)
IWM	Integrated Wavelength Meter (absolute wavelength accuracy: 5 pm)

Accessories

- LabView driver for Tunics Reference
- Fiber optic jumper FC-APC/FC-APC
- Fiber optic jumper FC-APC/FC-PC
- Polarization maintaining fiber optic jumper FC-APC/FC-APC
- Polarization maintaining fiber optic jumper FC-APC/FC-PC
- Carrying case

Each Tunics is delivered as standard with a FC-APC/FC-PC fiber optic jumper.

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